

IN THE CLAIMS

What is claimed is:

- 1 1. A system for treating parts by gas plasma reaction, comprising:
2 a reaction chamber having an open bottom;
3 a chamber base to which the bottom of said reaction chamber is vacuum-
4 tightly fittable;
5 lifting means for achieving vertical movement of said reaction chamber
6 relative to said chamber base;
7 at least one guide means for supporting said parts during treatment and
8 along which said parts may be moved in guidable fashion, said guide means being
9 located within said reaction chamber when said reaction chamber is fitted to said
10 chamber base;
11 input carrier means for conveying said parts to a location neighboring said
12 guide means;
13 output carrier means for conveying said parts to a location removed from
14 said guide means;
15 transfer means for moving and positioning said parts from said input carrier
16 means to and along said guide means, and along and from said guide means to
17 said output carrier means; and
18 gas plasma means for generating a gas plasma and inducing a plasma
19 reaction with said parts.

- 1 2. The system of claim 1 further including
2 sensor means for assisting said transfer means in the movement and

3 positioning of said parts relative to said guide means.

1 3. The system of claim 2 wherein
2 the sensor means employs infrared detection.

1 4. The system of claim 1 wherein
2 said transfer means includes at least one catch actuator for raising and
3 lowering a catch block capable of engageable abutment with said parts.

1 5. The system of claim 4 wherein
2 said transfer means further includes at least one horizontally disposed catch
3 finger having a length sufficient to extend over the travel area of said parts and to
4 which at least one of the catch actuator and the catch block are attached.

1 6. The system of claim 1 wherein
2 said transfer means includes a linear drive assembly.

1 7. The system of claim 1 wherein
2 said at least one guide means includes at least one chamber shelf upon
3 which said parts may be slidably transported, said chamber shelf having a load end
4 and an unload end, said chamber shelf being located upon said chamber base.

1 8. The system of claim 1 wherein
2 said at least one guide means includes at least two such guide means
3 arranged in multi-level array.

1 9. The system of claim 8 wherein
2 said input carrier means and said output carrier means each include a carrier
3 having multiple levels capable of carrying at least two said parts at different ones
4 of the multiple levels, the multiple levels corresponding in number to the number
5 of levels of said guide means and being spaceably distanced to be co-planarly
6 alignable therewith.

1 10. The system of claim 1 wherein
2 said input carrier means and said output carrier means each include a
3 conveyor mounted upon a horizontal position actuator for horizontal movement of
4 the conveyor thereupon.

1 11. The system of claim 1 wherein
2 said input carrier means and said output carrier means each include a
3 conveyor mounted upon a vertical position actuator for vertical movement of the
4 conveyor thereupon.

1 12. The system of claim 1 wherein
2 said gas plasma means includes means for applying Radio Frequency power
3 and means for applying DC bias power.

1 13. The system of claim 1 wherein
2 said gas plasma means includes at least one electrode upon which said at
3 least one guide means is mounted.

1 14. The system of claim 1 wherein

2 said gas plasma means includes at least one electrode which is vertically
3 oriented.

1 15. The system of claim 1 wherein

2 said lifting means includes at least one chamber lift actuator.

1 16. The system of claim 1 wherein

2 said lifting means includes at least one guide rod, and at least one pillow
3 block for maintenance of a generally strict vertical movement of the guide rod.

1 17. A plasma treatment system for treating parts, comprising:

2 a reaction chamber having an open bottom;

3 a chamber base to which the bottom of said reaction chamber is vacuum-
4 tightly fittable, said chamber base having a perimeter;

5 lifting means for achieving vertical movement of said reaction chamber
6 relative to said chamber base;

7 a plurality of guide rail pairs, said guide rail pairs each including two guide
8 rails arranged in parallel fashion and spaceably distanced to support said parts, at
9 least one of said guide rail pairs being located within the perimeter of said
10 chamber base, at least one of said guide rail pairs being located upon a
11 horizontally movable input carrier, at least one of said guide rail pairs being
12 located upon a horizontally movable output carrier, said guide rail pairs located
13 upon the input and output carriers capable of being moved into alignable
14 juxtaposition with said guide rail pair located within the perimeter of said chamber
15 base;

16 catch means for moving and positioning said parts along said guide rail
17 pairs; and
18 gas plasma means for generating a gas plasma and inducing a plasma
19 reaction with said parts.

1 18. The system of claim 17 further including
2 sensor means for assisting said catch means in the movement and
3 positioning of said parts along said guide rail pairs.

1 19. The system of claim 17 herein
2 said guide rail pairs are located in multi-level array, each multi-level array
3 capable of co-planar alignment with the other.

1 20. The system of claim 17 wherein
2 said catch means includes at least one catch actuator for raising and
3 lowering a catch block, the catch block capable of engageably abutting said parts
4 when lowered.

1 21. The system of claim 17 wherein
2 said gas plasma means includes means for applying Radio Frequency power
3 and means for applying DC bias power.

1 22. The system of claim 17 wherein
2 said gas plasma means includes at least one electrode upon which said at
3 least one guide rail pair located within the perimeter of said chamber base is
4 mounted.

1 23. The system of claim 17 wherein
2 said gas plasma means includes at least one electrode which is vertically
3 oriented.

1 24. A plasma treatment system for treating parts, comprising:
2 a reaction chamber;
3 means for supporting a plurality of parts in a multilevel array; and
4 gas plasma means for generating a gas plasma and inducing a plasma
5 reaction with said parts, said gas plasma means including means for applying
6 Radio Frequency power and means for applying DC bias power.

1 25. The plasma treatment system of claim 24 wherein
2 said means for applying Radio Frequency power and said means for
3 applying DC bias power is at least one electrode.

1 26. The plasma treatment system of claim 25 wherein
2 said at least one electrode is vertically oriented.

1 27. The plasma treatment system of claim 24 wherein
2 said supporting means is at least one magazine.